Virtual Temperature

From the user, an air temperature (T), a dewpoint temperature (T_d), and a station pressure (p_{sta}) are given.

To calculate the virtual temperature, the temperatures must be converted to units of degrees Celsius $(°C)$ and the station pressure (p_{sta}) must be converted to millibars (mb) or hectorPascals (hPa)

To see how to convert these units see the links below:

http://www.srh.noaa.gov/elp/wxcalc/formulas/tempConvert.pdf

http://www.srh.noaa.gov/elp/wxcalc/formulas/pressureConversion.pdf

Then, the virtual temperature (T_v) can be calculated using the formula below:

$$T_v = \frac{T + 273.15}{1 - 0.379 \times \left(\frac{6.11 \times 10^{\left(\frac{7.5 \times T_d}{237.7 + T_d} \right)}}{p_{sta}} \right)}$$

The virtual temperature answer will be in units of Kelvin (K), but virtual temperatures can be converted to other units using the link above.